

CLAIMS

I CLAIM:

1. A process instrument comprising:
  - 2 a housing;
  - a terminal in the housing for connection to a two wire process loop;
  - 4 an active element for sensing a characteristic of a process;
  - a control circuit disposed between the terminal and the active element for
  - 6 measuring the sensed characteristic and controlling the two wire process loop responsive to the sensed characteristic; and
  - 8 a split intrinsic safety barrier comprising current limiters electrically connected between the terminal and the control circuit and a diode safety barrier electrically connected
  - 10 between the control circuit and the active element.
2. The process instrument of claim 1 wherein the active element comprises a
- 2 guided wave radar transmission line.
3. The process instrument of claim 1 wherein the active element comprises a
- 2 capacitance probe.

4. The process instrument of claim 1 wherein the active element comprises a  
2 through air radar transducer.

5. The process instrument of claim 1 wherein the active element comprises  
2 an ultrasonic transducer.

6. The process instrument of claim 1 wherein the current limiters comprise  
2 fuses.

7. The process instrument of claim 1 wherein the diode safety barrier  
2 comprises a plurality of diodes connected across the active element.

8. The process instrument of claim 1 wherein the diode safety barrier  
2 comprises a plurality of pairs of reverse connected diodes.

9. The process instrument of claim 1 wherein the diode safety barrier is AC  
2 coupled to the control circuit.

10. The process instrument of claim 1 wherein the diode safety barrier  
comprises a current limit resistor.

2                   11.     An explosion proof process instrument comprising:  
an explosion proof housing;  
4                   a terminal in the housing for connection to a two wire process loop;  
an active element operatively connected to the housing for sensing a characteristic  
6     of a process;  
a control circuit in the housing disposed between the terminal and the active  
8     element for measuring the sensed characteristic and controlling the two wire process loop  
responsive to the sensed characteristic; and  
10                  a split intrinsic safety barrier in the housing comprising current limit means  
electrically connected between the terminal and the control circuit for limiting energy to the  
12     control circuit and safety barrier means electrically connected between the control circuit and the  
active element for limiting output voltage to the active element.

2                   12.     The explosion proof process instrument of claim 11 wherein the active  
element comprises a guided wave radar transmission line.

2                   13.     The explosion proof process instrument of claim 11 wherein the active  
element comprises a capacitance probe.

14.     The explosion proof process instrument of claim 11 wherein the active

2 element comprises a through air radar transducer.

15. The explosion proof process instrument of claim 11 wherein the active  
2 element comprises an ultrasonic transducer.

16. The explosion proof process instrument of claim 11 wherein the current  
2 limit means comprise fuses.

17. explosion proof process instrument of claim 11 wherein the safety barrier  
2 means comprises a plurality of diodes connected across the active element.

18. The explosion proof process instrument of claim 11 wherein the safety  
2 barrier means comprises a plurality of pairs of reverse connected diodes.

19. The explosion proof process instrument of claim 11 wherein the safety  
2 barrier means is AC coupled to the control circuit.

20. The explosion proof process instrument of claim 11 wherein the safety  
2 barrier means comprises a current limit resistor.